

MONTHLY WEATHER REVIEW,

DECEMBER, 1873.

WAR DEPARTMENT,

Office of the Chief Signal Officer,

DIVISION OF

TELEGRAMS AND REPORTS FOR THE BENEFIT OF COMMERCE AND AGRICULTURE.

STORMS.

During this month twelve storms, of greater or less severity, have prevailed along or within the borders of the United States. (See Storm Track Chart No. 1.) Of this number, six have come from the Southwest and the region of the Gulf of Mexico, and six from the Northwest and upper lake region. The most violent have come from the Southwest and Gulf, and have moved in every instance in a northeastwardly course, four of them keeping to the west of the Alleghany Mountains, and two making their way on the eastern side of this range.

The paths of the storms which approached from the Northwest lie in a southeasterly direction till they attain the eighty-fifth meridian, and then are deflected northeastwardly toward the Saint Lawrence Valley and New England. In discussing these December storms, it should be noted that the intensity of cyclonic action and the amount of barometric depression are strikingly connected with the progressive velocity of the storm-centre.

These twelve storms were not all of marked or important features. The following facts are mostly worthy of notice:

No. I. Apparently originated in Kansas, and advanced northeastwardly over western Lake Superior, with, however, no very high winds or heavy precipitation.

No. II. Rapidly followed No. I, if indeed, it was not the main cyclone from which its predecessor was an offshoot. This extensive storm originated in Kansas, on the morning of the 2d of December, and progressed slowly toward Lake Michigan, which it crossed on the morning of the 4th, and thence moved over Lake Huron, attended in its destructive course by winds, having velocities ranging from forty-five to sixty miles per hour. Since 1844 (unless, perhaps, the "gale" of 1865 be excepted) no severer storm has been felt over the Lakes. Simultaneously, snow-storms prevailed westward to California, with unusual cold. It would therefore appear that cold northerly winds pressed hard upon the rear of this cyclone, and covered the whole of the trans-Mississippi country. Indeed, the beginning of the widespread disturbance was premonished by a *heavy sand-storm*, December 1, at Yuma; and all along the Gila River, on the night of that day, heavy condensation took place. This storm moved in a northeastward direction, after passing over Lake Huron, and hence it disappeared from beneath the Signal Service observations.

No. III. Originated, so far as the office observations can decide, in southern Texas, on the 5th, and after approaching the Indian Territory, on the 6th, disappears. It was a very feeble storm.

No. IV. Originated in the upper Missouri valley, on the afternoon of the 7th, and moved during the evening and night to Omaha, whence it passed in a northeastwardly course to Lake Superior. After reaching this Lake, its track lies in a direction almost due east toward the lower Saint Lawrence valley.

No. V. First appeared at midnight of the 10th near Duluth, and, with a slight southeastwardly deflection of its course, moved toward the lower Saint Lawrence valley.

No. VI. Began in New Mexico, and, during the night of the 10th and the forenoon of the 11th, advanced eastward to the central Arkansas valley, and thence moved northeastwardly over Missouri and Illinois on the 12th. It passed eastward over New York, and reached the Atlantic coast the night of the 13th, and on the morning of the 14th its centre was near Halifax, Nova Scotia.

VII. Confined its course very closely to the Lake frontier of the United States. It commenced on the 17th, in the upper lake region, and disappeared in Canada on the 18th.

No. VIII. Began simultaneously in the Southwest, and advanced slowly in a direction almost due northwest over the Ohio Valley. It was attended by heavy precipitation and high winds, disappearing near Nova Scotia on the 20th.

No. IX. Commenced on the 21st, near the mouth of the Rio Grande River, and, skirting the Gulf coast, crossed over northern Florida on the night of the 22d, thence making its pathway along the main axis of the Gulf Stream.

No. X. Began in the Gulf, and on the night of the 24th passed over southern Florida and thence along the Atlantic sea-board. It reached the Nova Scotia coast on the 27th. This gale was followed by heavy snow-storms in New England, the snow falling two feet deep in some places.

No. XI.—Began in the extreme Northwest on the 25th, and, after pursuing a southeastward course to Lake Erie and New York, bore away in the direction of Nova Scotia.

No. XII. Is first seen on the morning of the 28th on Lake Superior, whence it coursed nearly due eastward along the Lake frontier, but with no very marked effects.

ANTI-CYCLONIC AREAS.

There were eight areas of decided high pressure, which traversed the country during the month. They originated mostly in the Northwest, and preserved a course nearly southeastward toward the south Atlantic states. The only noticeable feature in the anti-cyclonic areas is their variety, their smallness, and inferior barometric intensity, as compared with the very remarkable anti-cyclones of December, 1872.

TEMPERATURE.

There has been no deficiency of temperature in any section of the United States furnishing weather reports. On the contrary (except in the Gulf States, where it was normal), the thermometer has everywhere ranged from $1^{\circ}3$ to 8° Fahrenheit above its usual December height. The greatest excess of warm weather has been in the upper and lower lake regions. The mean excess in all the sections (see Chart No. 3, Table of Temperatures) is nearly 4° for the month—an excess much more potential, in its climatic effect, than would appear from the figures.

PRECIPITATION.

The precipitation in the United States for December was decidedly in excess of the usual amount. In the lower lake region, the upper Mississippi valley, the Ohio and lower Missouri valleys, the excess is most palpable. Elsewhere, save in the Gulf and Middle States, the normal precipitation is reported. Chart No. 2 explains itself. The rainfall deficiency in the Southwest will not be felt, agriculturally, inasmuch as an excess of rain fell in November.

PECULIAR PHENOMENA AND FACTS.

The observer at Cape May reported on the 19th of December, "at 6 p. m., in the southwest, a flash of lightning, which had the appearance of the explosion of a ball or bomb;" also a great amount of "sheet-lightning." The observer at Pike's Peak, among other interesting observations, notes the peculiar effect of sunset in these words: "In the distance, to the northeast, a heavy mist was overhanging the plains. On this mist was depicted a perfect shadow and profile of our peak by means of the setting sun. The image is so realistic that one could hardly credit that it was merely a shadow, and not a lofty peak, rising abruptly from the prairie. This continued for the space of fifteen minutes, when it gradually melted away in the mist, as the sun was setting behind the gigantic peaks of the 'Snowy Range.'" At Cape Henry, during the night of December 21, the brig "Mary Rice," from Rio Janeiro bound to Baltimore, was wrecked within sight of the new Coast Signal Station. The observer, by promptly telegraphing to Norfolk, procured help, and the entire cargo was secured and the ship saved. At Lexington, Ky., a "lunar rainbow," with the prismatic colors, was seen on the night of the 1st. In the storm of the 4th, at Toledo, the river was nearly emptied of water by the wind, and buildings were damaged to the extent of \$75,000. Auroral displays have been rare during the month and very faint. A "mock sun" was observed at Saint Paul, Minn., on the 4th and a beautiful "parhelion circle" on the morning of the 29th. Much lightning and thunder were reported from the upper Mississippi valley, showing the presence of the great equatorial air-current.

The amount of fog which prevailed in the United States in December was very great, and is probably due to the fact that neither the great equatorial nor the broad polar current has been established over the country, but, rather, both currents brought into juxtaposition on its eastern side.

In the latter part of November, vast prairie fires occurred in the far West, and several *dust storms*, filling the air with fine and impalpable particles, which are known to remain suspended in the air for many days, and sometimes are finally precipitated with water, forming the celebrated "*black rain*."

The hail-storm at Nashville on the 18th was so sudden in its approach that none suspected it, and the streets were lined and thronged. The hail-stones were about the size of almonds, and generally very smooth and even in form, and covered the ground to a depth of an inch. The hail-storm originated with a smooth sheet of stratus cloud, supplanting a low-moving scud, and a sudden shift of wind from south to northwest.

THE RIVERS.

These will be seen in the table on the precipitation chart (No. 2), right side. It will be observed there was an extraordinary rise in the Mississippi, at Cairo, Memphis, and Vicksburg, from the 18th to the 30th of December. This was caused by the enormous floods in the Ohio and its tributaries from the 9th to the 18th ultimo, on which last-named day the Ohio was 44 feet and 2 inches above the low-water mark. It will be seen from the table that all the Western water courses have been full during the past month—a fact which gives promise for the next season's agricultural yield.

The excessive rains which found their way early in December to the upper Ohio, were probably due to the projection of the cold polar current in the rear of the great storm of December 3 and 4, already described. The cold current served to condense the vast floating reservoirs of vapor which the cyclone had drawn to its eastern side and front from the Gulf of Mexico.

CAUTIONARY SIGNALS.

During the month of December there were hoisted at American ports sixty-three cautionary signals, and for Canadian ports thirty-four storm premonitions were telegraphed.

The display of cautionary signals on the Lakes was suspended after the 10th of December, by which time navigation was entirely closed.

Out of the whole number 1 storm-warnings displayed at all American ports, four are doubtfully justified, but the number known to have been *actually justified* is forty-seven, which gives as the percentage of verification 73.43. The office has no returns to show how many were verified at the Canadian ports.

The display of these signals at the various ports was generally respected, and the confidence in their accuracy may be seen by the reports of their reception, of which a few specimens may be given: Thus, at Alpena, Mich., when on the 1st a storm-signal was displayed, "steamers in port delayed going out till morning of the 2d." At Boston, Mass., December 26, after signal was displayed, "all shipping remained in port." At New Haven, December 23, "the warning attracted considerable attention in the city, owing to the subsequent snow." At Wilmington, N. C., December 26, "the signal was generally heeded by mariners and those engaged in shipping-business." Similar reports frequently come from Chicago and other sea-ports.

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ALBERT J. MYER,

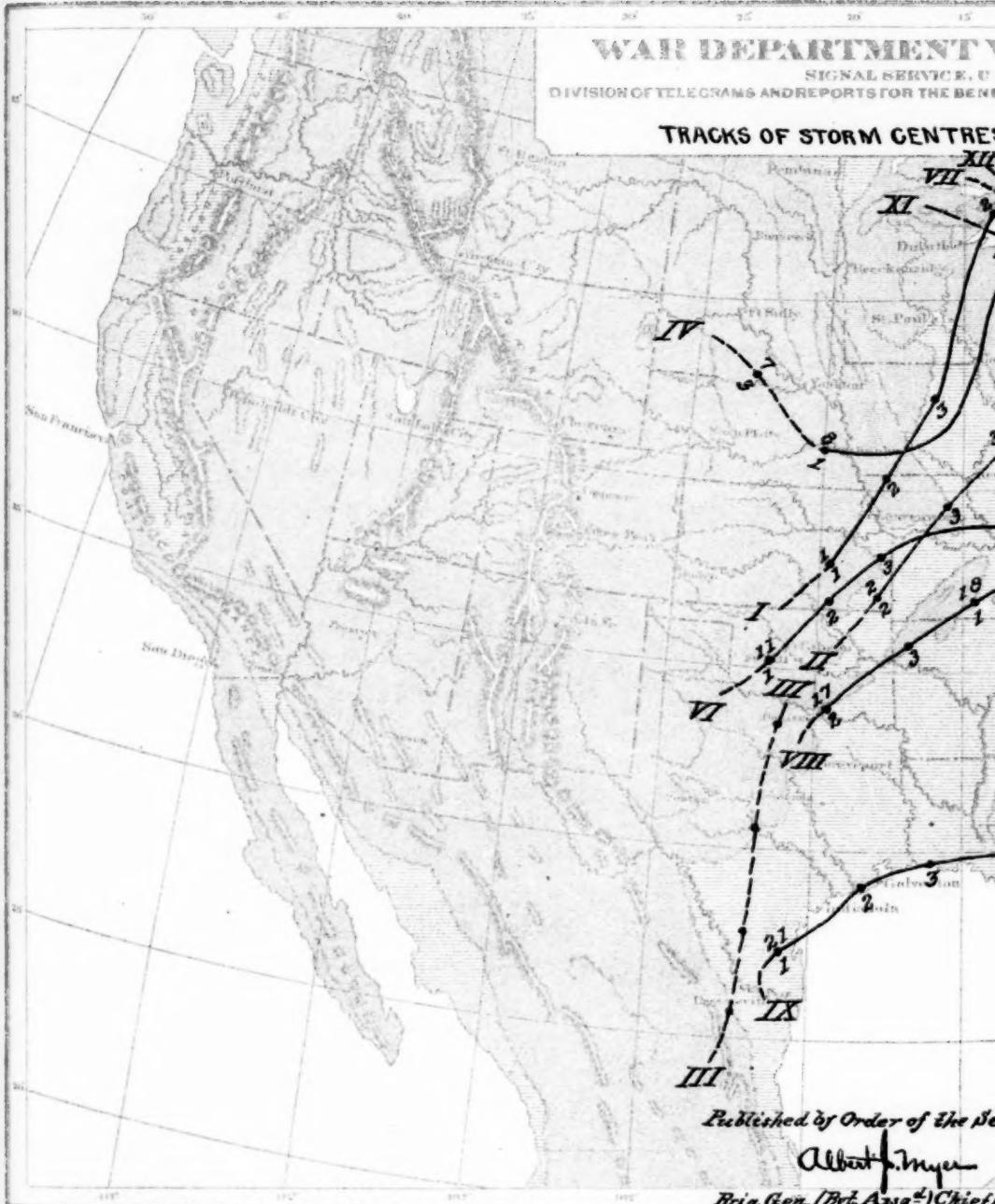
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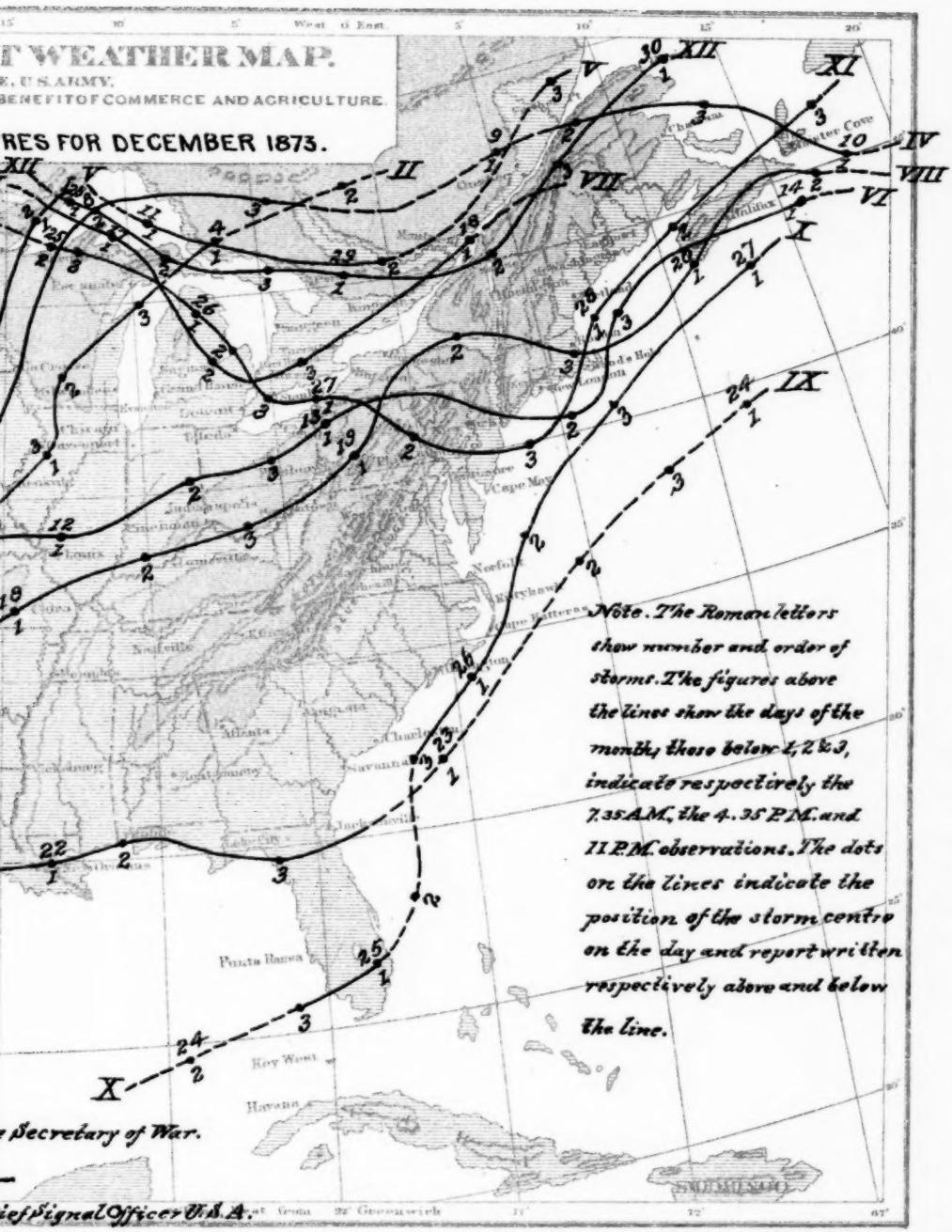
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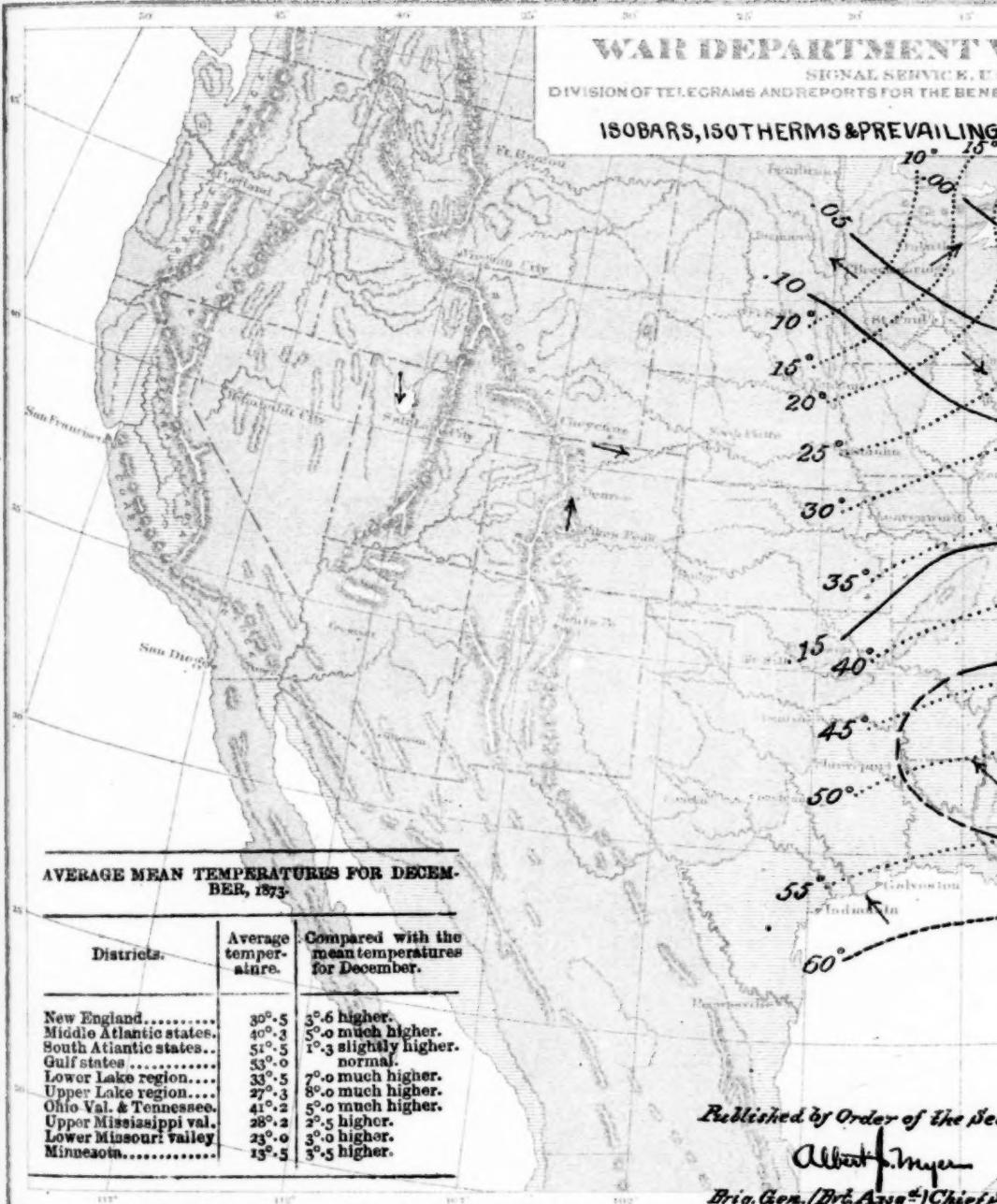
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TRACKS OF STORM CENTRES





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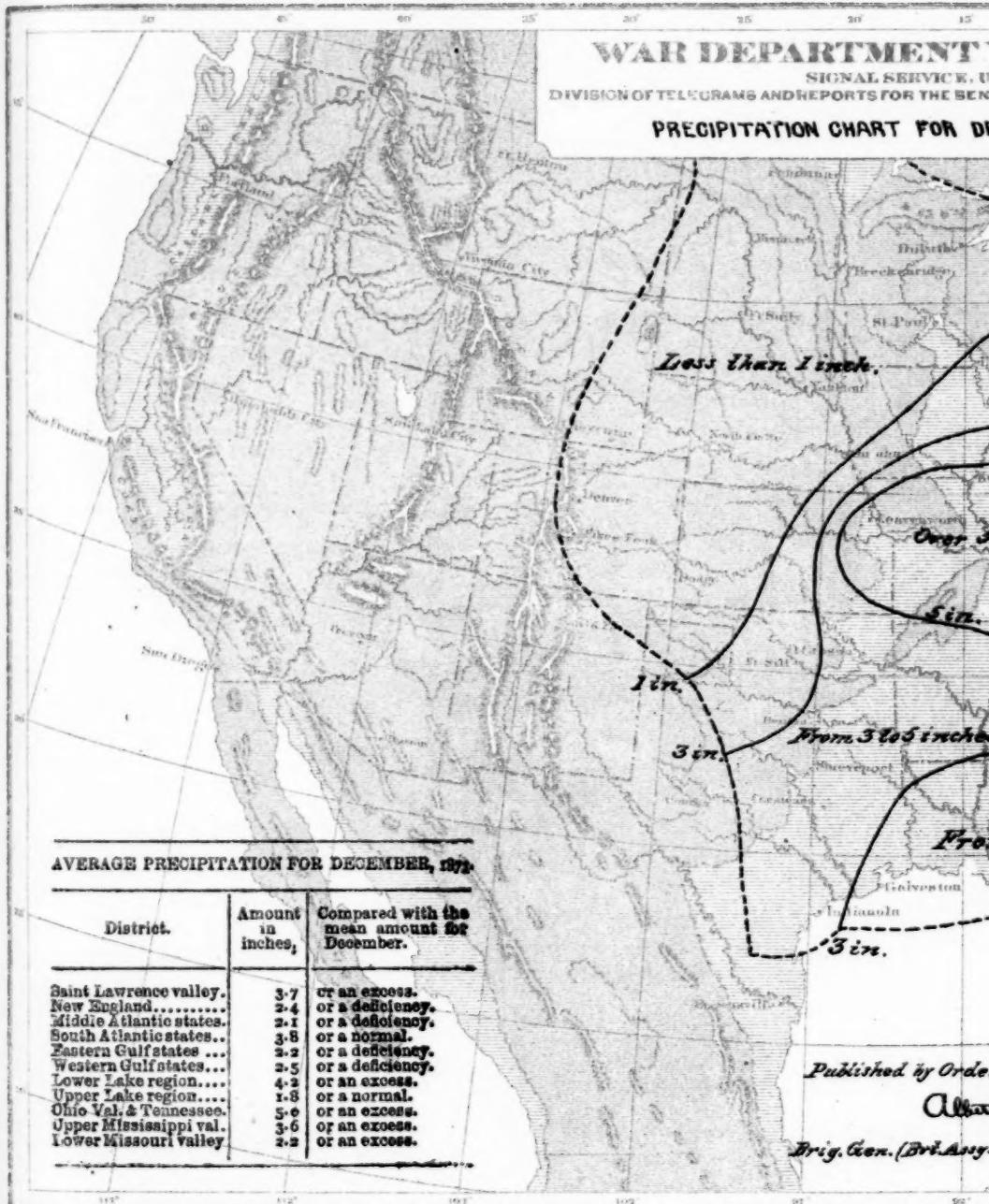
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Albert J. Myers
Brig. Gen. (Br. Army) Chief of Staff

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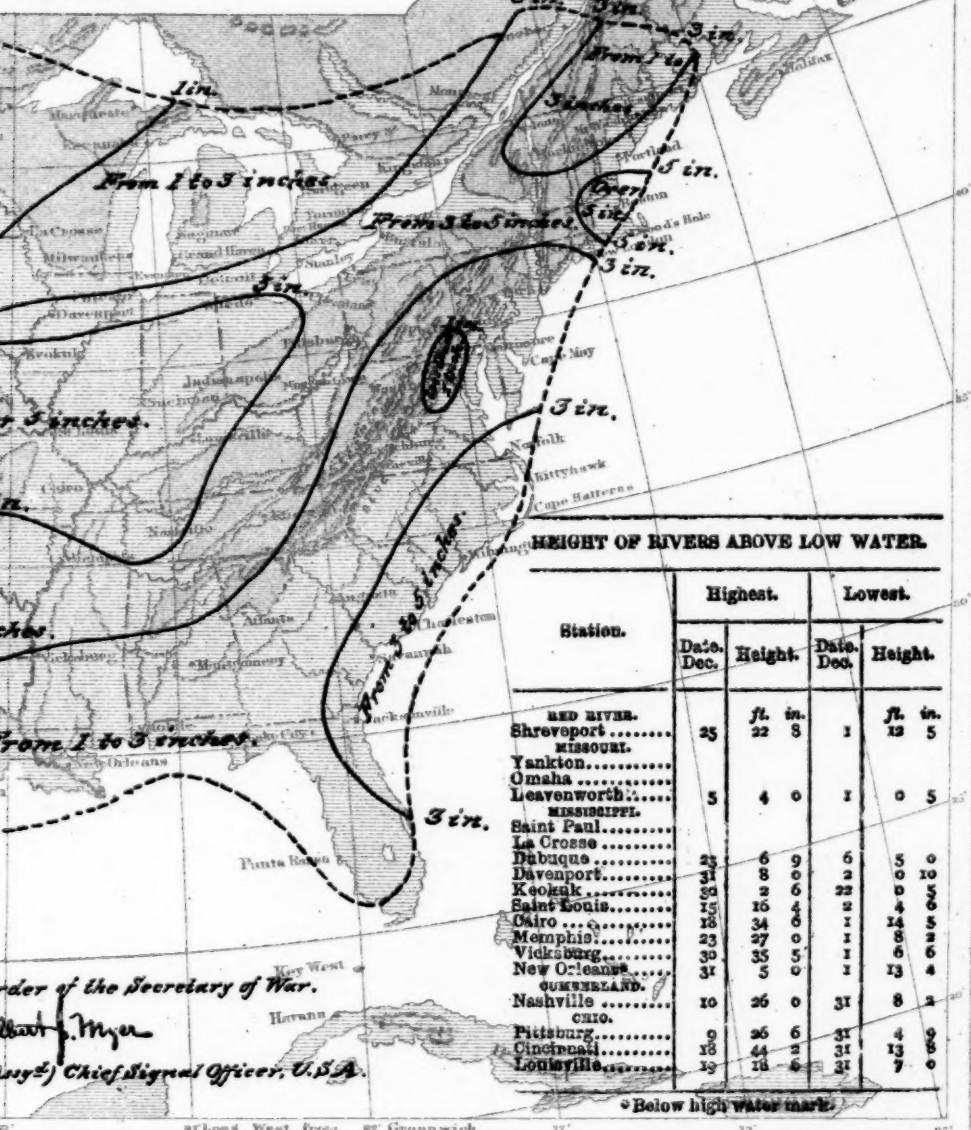
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PRECIPITATION CHART FOR D



THE WEATHER MAP.
U. S. ARMY.
BENEFIT OF COMMERCE AND AGRICULTURE.

DECEMBER 1873.



Order of the Secretary of War.

W. F. Myer

Chief Signal Officer, U. S. A.

15° Long. West. From 0° Greenwich

30°

45°

60°

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